Chapter III – Truck Transportation

Truck Transportation Overview

- In 1998, Trucking was a $486.1 billion industry, accounting for 86.5% of the nation's freight bill. This includes both for-hire and private carriage
  - Trucks transported 7.7 billion tons of freight in 1998 (including primary and secondary movements). This accounts for 63% of all freight moved in the United States
  - Trucking industry represented 5% of US GDP in 1990

Ford's first Trucks 1905

When do shippers use trucks?

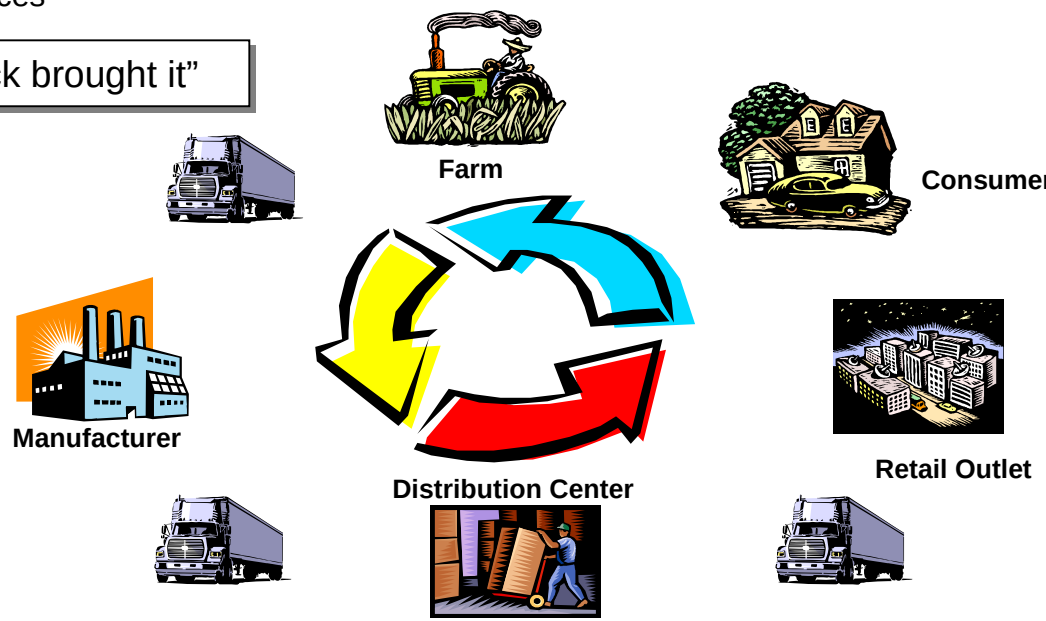
Trucking is the “default” mode

- Pre-bundled truck delivery in terms of sale
- Lack of knowledge regarding complex alternatives
- Risk seen in alternatives
- Shortage of management time and resources to explore choices

“If you got it, a truck brought it”

Truck Freight Characteristics match most commodities

- Low density
- Service sensitive
- Highly fragmented
- High Value

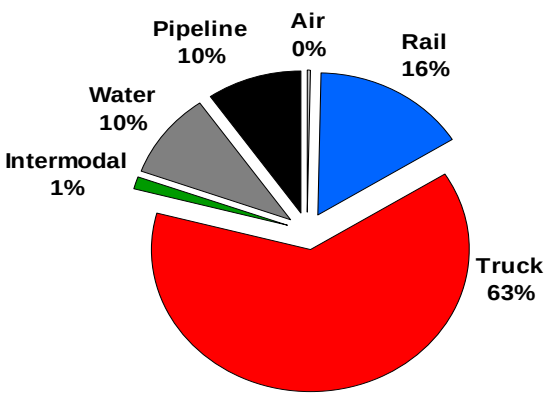


Trucking Dominance

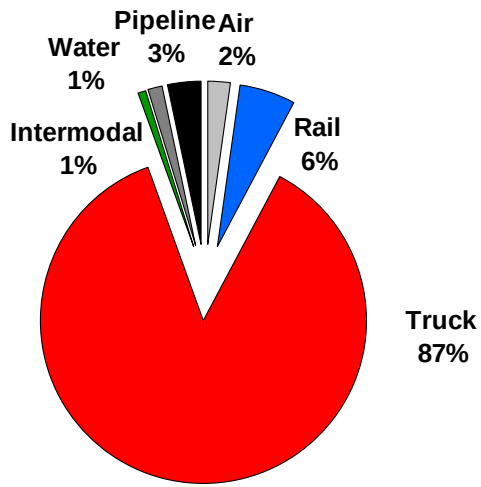
By any measure, trucking is the dominant freight mode

Exhibit 13: Trucking Freight Dominance

Truck Is the Largest Mode by Tonnage (Millions of Tons)



Trucking is the Largest Mode by Revenue (Billions of Dollars)



Mode Participation by Freight Type

- Trucks have captured tremendous market share because of their flexibility and access to industrial manufacturers and commercial marketplaces.
- This ability to handle general freight as well as bulk freight will allow trucks to continue to dominate the transportation market.

Exhibit 14: Modal Participation by Freight Type

Mode	Volume (MM tons)	General Freight	Bulk Freight
Truck	7688.7	44.71%	55.29%
Rail	1924.6	31.14%	68.86%
Intermodal	148.9	92.29%	7.71%
Air	18	99.5%	.5%
Water	1187.2	13.57%	86.43%
Pipeline	1188.3	0%	100.00%

Shipment Value by Mode

- Every five years the Bureau of Transportation Statistics and the U. S. Census Bureau team up to conduct the Commodity Flow Survey. The 1999 edition of “Trends” reported preliminary data from the 1997 Commodity Flow Survey.
- Trucking hauled nearly $5 trillion worth of merchandise , an increase of 13.1% from 1993

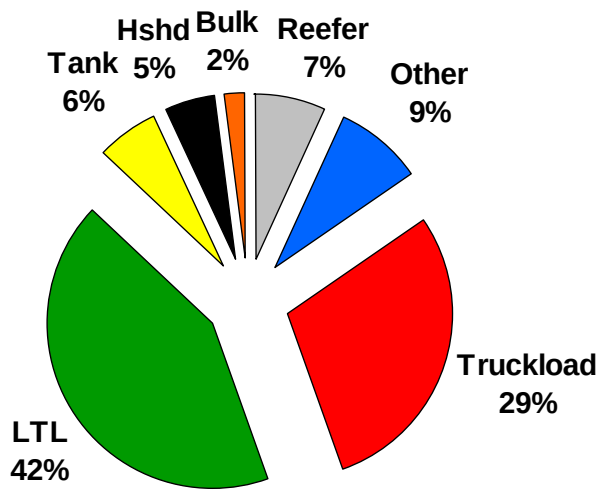
Exhibit 15: US Shipment Value by Mode

Mode	Value	Percent
Parcel, USPS Courier	$ 855,897	12.3%
Private Truck	$2,036,528	29.3%
For- Hire Truck	$2,901,345	41.8%
Air	$ 229,062	3.3%
Rail	$ 319,629	4.6%
Pipeline	$ 113,497	1.6%
Water	$ 75,840	1.1%
Truck and Rail	$ 75,695	1.1%
Other unknown modes	$ 6,943,988	4.0%

Truckload and Less-than-truckload "dry" carriers

- Over-the-Road (OTR) trucking includes two major kinds of service relevant to this study:
- Truckload service (TL) – For-hire or private units moved as a single shipment directly between origin shipper and consignee.
  - Dry van
  - Tank, flatbed, refrigerated, bulk, etc.
- Less-Than-Truckload service (LTL) and Parcel Service Long-haul trucks move multiple shipment between terminals with local pickup and delivery by smaller trucks.

. ***Exhibit 16: Trucking Industry Segments***

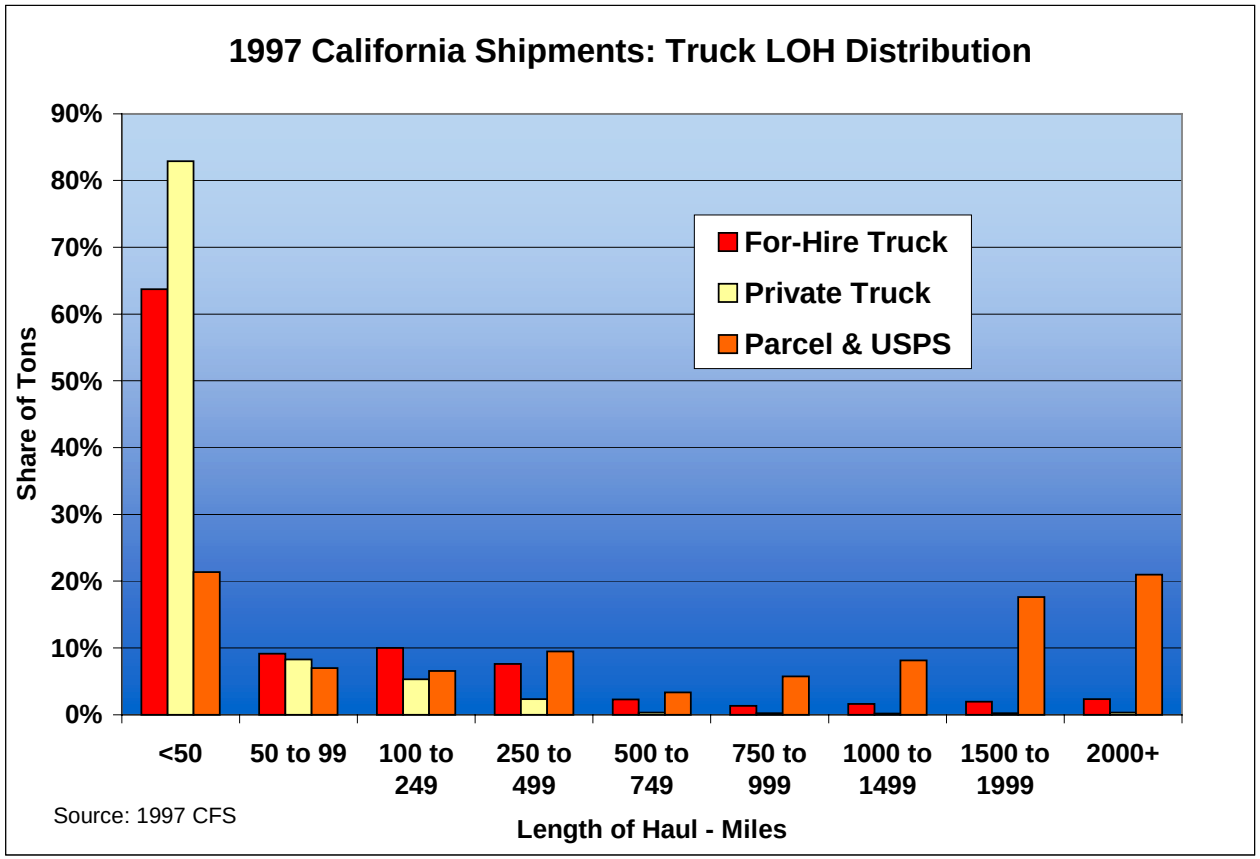


Trucking Industry Segments 1997
Distribution of Carrier Revenues

Trucking Length of Haul Distribution

- For-hire and private trucking are concentrated in the shortest hauls.
- Parcel & postal service movements include long hauls as well.
- The “middle ground” is mostly empty due to spare markets.

Exhibit 17: California Trucking Length of Haul



Trucking is Integral to the Global Supply Chain

- Trucks have evolved as one of the most critical links in our economy, connecting shippers with manufactures and manufacturers with customers.
  - The speed and flexibility of the global distribution system is heavily dependant upon trucks.They are essential to the flow of goods and the reduction of inventories.
  - Trucking employs 9.7 million people. One in every 13 people is involved in a trucking company.
- Trucking provides the connections between larger more inflexible infrastructure:
  - Shippers and the railroad
  - Rail connections between carriers (Chicago, Memphis, New Orleans)
  - Rail and Port terminals
  - Rail and distribution centers or manufacturers
- Trucking shuttle service to inland container facilities provides an extended market reach for Ports and steamship companies.
  - Eastern ports have established off site terminals to meet the needs of a global economy
  - Trucking provides seamless connection between inland industries and water transportation.

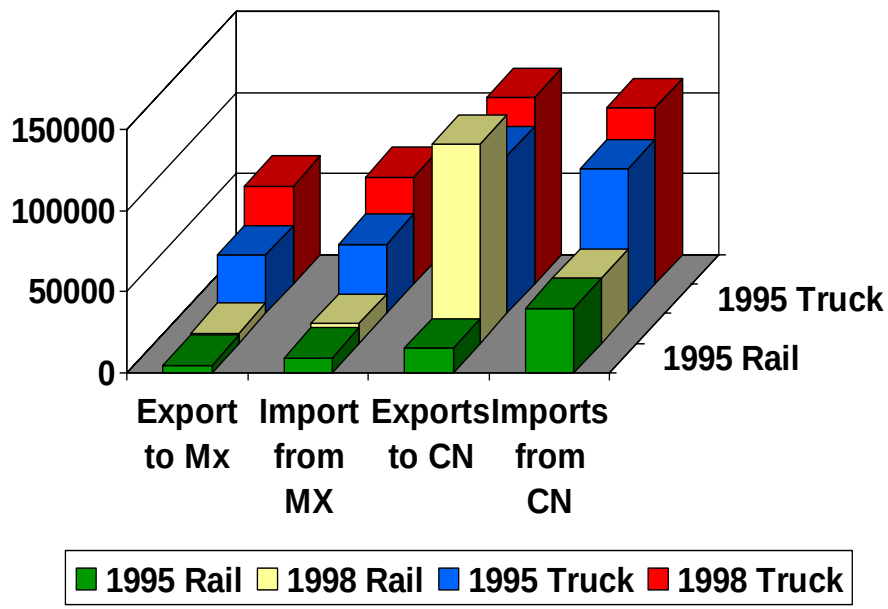
Trucking is Critical to North American Transportation

This chart shows the value of surface trade between the US and Mexico and Canada by mode.

- Trucks haul 86% of the shipment values into Mexico
- Trucks haul 81% of the shipment values out of Mexico'
- Trucks haul 83% of the shipment values into Canada
- Trucks haul 67% of the shipment values out of Canada

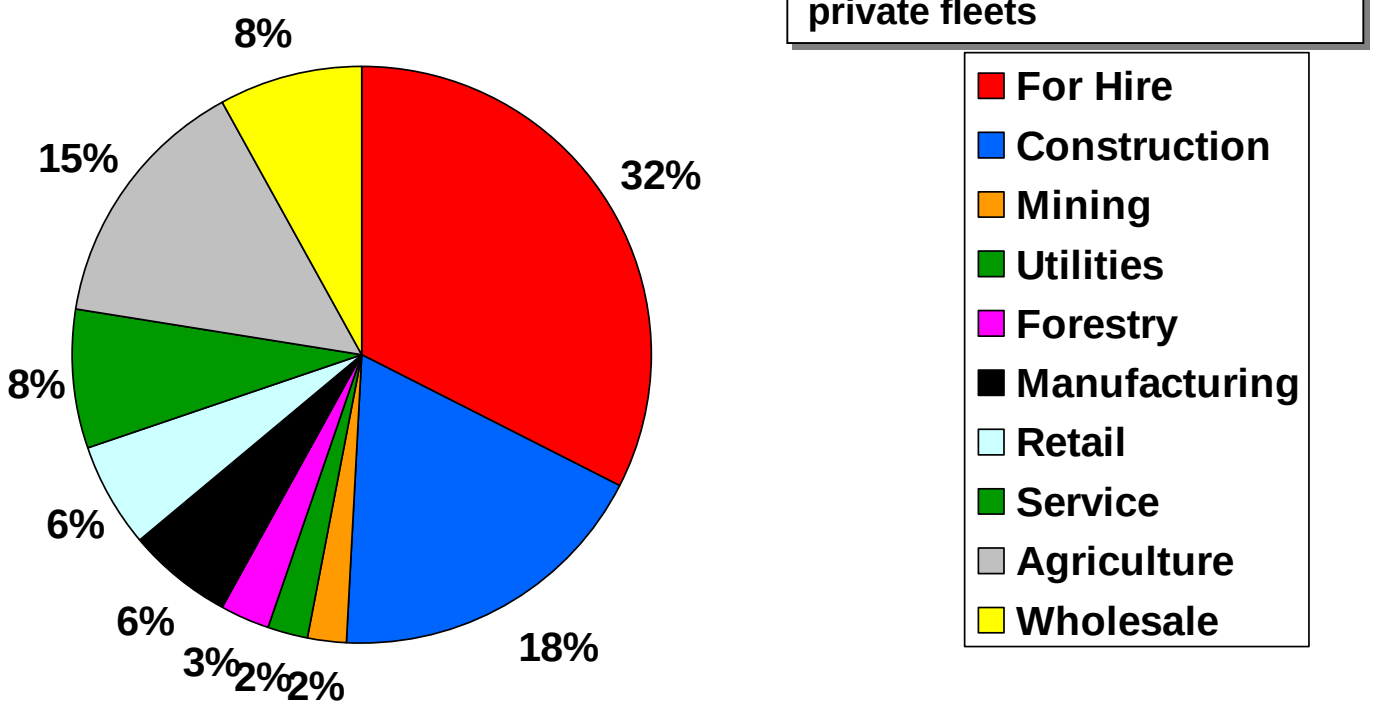
Arguably 100% of off shore shipments move one leg via truck (data expressed in terms of value of shipments)

Exhibit 18: Truck Share of Transborder Traffic



Most heavy-duty trucks are in private fleets

Exhibit 19: Distribution of Heavy Trucks by Major Use 1997



Most trucks serve local and short-haul markets

- Distribution of Heavy Trucks
  Range of Operations 1997
  - 39.5% local (down from 44.6% in 92)
  - 16.7% short range (increase from 15.9% in 92)
  - 16% long range (up from 13.7% in 92)
  - 23% mid range (up from 20% in 92)

Size of the US Trucking Industry

20 Million Trucks

- 2.3 million class 8 trucks
- 4.4 million commercial trailers
- Largest number are private fleets

414 billion Miles in 1998

- Class 8 average 48,000 miles/year
- Many long haul trucks travel more than 100,000 miles per year

501,744 interstate carriers as of March 2000 (up from 20,000 in 1980)

- 72.1% operate 6 or fewer trucks
- 80.3% have 20 or fewer trucks

9.7 million people are employed in trucking (1998)

3 million truck drivers of all types (1999)

New Truck Sales

Sales of new trucks were up in 2000, but are expected to decline in 2001

Light trucks – pickups, vans, SUVs –account for most of the trucks being built.

Exhibit 20: New Truck Sales

	2000 9 Mos	1999 9 Mos	Change	2-yr Share
Light trucks	**5,850,108**	**5,531,566**	**5.8%**	**92%**
Class 1 (0-6000lbs)	3,995,903	3,774,446	5.9%	
Class 2 (6,001–10,000 lbs.)	1,854,205	1,757,120	5.5%	
Medium Duty Trucks	**190,928**	**187,966**	**1.6%**	**3%**
Class 3 (10,001–14,000 lbs.)	89,786	91,857	-2.3%	
Class 4 (14,001–16,000 lbs.)	36,614	37,887	-3.4%	
Class 5 (16,001–19,500 lbs.)	22,268	23,362	-4.7%	
Class 6 (19,501–26,000 lbs.)	42,260	34,860	21.2%	
Heavy Duty Trucks (Semis)	**267,575**	**293,586**	**-8.9%**	**5%**
Class 7 (26,001–33,000 lbs.)	97,518	100,070	-2.6%	
Class 8 (33,001 lbs. +)	170,057	193,516	-12.1%	
Total	**6,308,611**	**6,013,118**	**4.9%**	**100%**

Source: National Truck Equipment Association

Full Truckload Carriers – Plain Vanilla Trucks

- "For Hire" commercial trucking in full loads from shipper to receiver
  - Primarily 53' trailers and long-haul Class 8 tractors with single drivers, often with sleeper cabs
  - Names like Swift, MS Carriers, J.B. Hunt and Werner come to mind in this category. The majority of the "for hire" truckers are in this category. Many of these same companies also offer dedicated services.

Full Truckload Carriers

Market Drivers

Ease of doing business

Best fit for short haul movements

Door to door control

No need for intermediaries

Class 8 tractors

Carrier's Perspective

Irregular route business

Highest driver turnover, irregular hours

450-550 miles per driver/day

28,000 lbs per load

53' trailer dominates market

Must keep empty miles low

Driver paid per loaded route mile

Rates vary based on market surplus or deficit

Variety of driver work

Up to three trailers to single driver

Non-union operation

Some intermodal lanes may convert business

Less Than Truckload (LTL) and Small Package Carriers

Less-than-truckload shipments consolidated at terminals (hubs) into full line-haul truckloads, then deconsolidated and delivered at origin

Includes UPS, FedEx Ground, Postal Service

Includes major national LTLs such as Yellow Freight, Consolidated Freightways, and Roadway

This type of equipment is used to gather and disperse freight to and from the crossdock where full truck load shipments are consolidated in dense lane networks.

Less-than-Truckload

Market Drivers

Less than 10,000 lbs per shipment

No freight to consolidate

At certain point may be cheaper to ship in full truckload for improved service.

Will grow with e-commerce trends.

Carrier's Perspective

Union mostly.

Hub and spoke distribution network.

Rail use limited by union agreement.

Longer transit than single truck due to handling at pick up and delivery nodes.

Typical LTL/Parcel (UPS) Shipment Cycle

- A driver picks up a package at 4 p.m. in Montgomery, Ala. It is destined for Greenville S.C. The driver returns to the Montgomery operating center where the Greenville package is put aboard a tractor - trailer that departs by 7 p.m. for a major hub near Atlanta.
- There, that package and all others are unloaded and put through the "sort" at the hub. Every operating center connected to this hub sends its packages in for sorting.
- The package destined for Greenville is sorted into the tractor-trailer that comes into the hub from Greenville. At 2 a.m. when the sort is completed, the Greenville vehicle departs for its operating center.
- When the package arrives in Greenville, it is loaded aboard the delivery vehicle that serves that address, and will be delivered before noon.
- Packages traveling greater distances move from hub to hub. For instance, if a package for Greenville were to originate in Chicago, it would be loaded aboard a feeder at a Chicago hub and taken to the hub near Atlanta. From there, it would move to Greenville in the same manner as the Montgomery package.

Intermodal Drayage

Market Drivers

Local or intercity.

Move containers and trailers between ports, railroads, and customers.

Derived demand from maritime and rail activity.

Many providers in local markets.

High variability in information capabilities and performance.

Carrier's Perspective

Drayage can be local or regional

Drivers are home every night

Relies heavily on independent owner-operators

Time based rate structure.

Highest stem time.

Information intense.

Equipment interchanges and damage inspections critical.

Round trip rates.

Private Trucking

Non-commercial, not for hire trucking

Operated for the firm's own business

The majority of trucks on the road are private

Dedicated and/or Contract Trucking

For-Hire commercial trucking under contract to a single customer and dedicated to that customer's business

Commonly replaces private fleets

Examples include Summit (for Safeway) and Marten Brower (for McDonald's)

It is often hard to distinguish between dedicate and private fleets.

- In these pictures, note the Pepsi truck has a Pepsi tractor. Pepsi contracted out with a full truckload carrier to paint and provide dedicated service for this company.
- The Dupont Tank truck is being pulled by a privately owned tractor. This is an example where Dupont owns the tank truck and the driver is hired on a contact basis.

Dedicated or Contract Trucking

Market Drivers

Used in closed loop applications

Gives control of multi-stop scheduling.

Lower cost than irregular route truck if route structure can yield low empty miles.

Highest service performance

Often used for intra-company shipments.

Class 8 tractors

Carrier's Perspective

Highest utilization

Highest driver satisfaction

Predictable routes and mileage

Often characterized by private fleet of trailers.

Most profitable if empty miles are low.

Dedicated Trucking is a For Hire carrier's term for the type of service offered when a "private fleet" is taken over. There was a significant trend in the middle 90's to outsource private fleets. The idea was that a full truckload carrier would have a driver pool which could buffer peaks and valleys in a private fleet's annual work pattern. It was also assumed that the full truckload carrier would have the infrastructure to maintain the equipment and the administration to better track regulatory issues and reporting. Service levels are almost always higher when a route is "engineered" or dedicated to a closed loop operation.

Large carriers with dedicated fleets are J.B. Hunt, M.S. Carriers, Werner, Schneider and others.

Bulk/Tank/Specialized Trucking

There are numerous other segments of the trucking industry.

- Wide variety of specialized trailers including tanks, hoppers, flatbeds, etc.
- Markets range from national to local niches

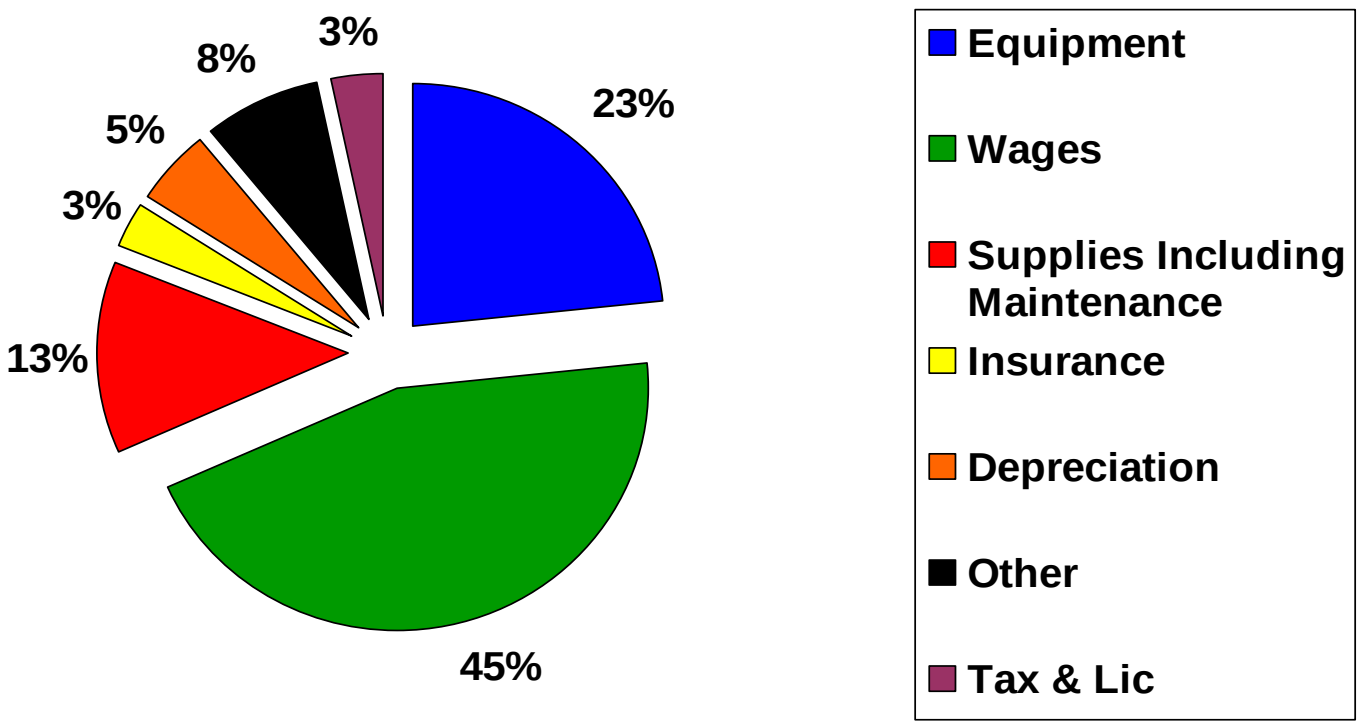
These types of trucking, however, are largely irrelevant to the potential for shifts between truck and rail.

These types do become significant, however, in the pick-up and delivery functions for rail-truck transloading

Trucking Industry Operating Expenses

- Trucking industry operating costs include numerous overhead categories, notably insurance and depreciation, as well as the obvious fuel, labor, and equipment expenses.
- Labor and equipment costs together account for 78% of the total

Exhibit 21: Trucking Cost Shares



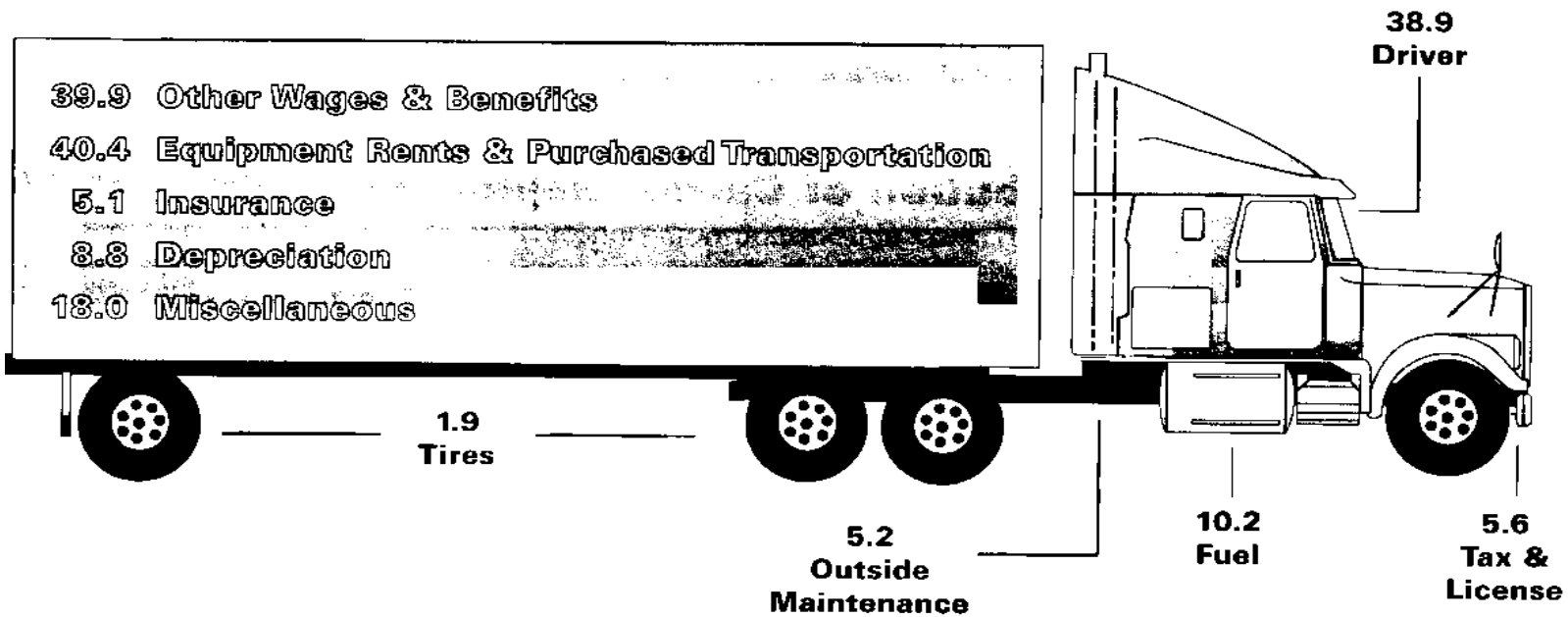
Truckload Operating Costs: About $1.12/mile

Exhibit 22: Truck Operating Costs

1998 Cost per Mile

(in cents)

Fig. 15



SOURCE: *Motor Carrier Annual Report,* ATA Trucking Information Services. Derived from reports filed with the U.S. Department of Transportation by carriers with $3 million or more in annual revenue. Figures include all types of carriers that filed with the DOT, except household goods carriers.

Truck Issues and Outlook

By every indication the trucking industry is in for difficult times.

- The driver shortage is not going away, and it is affecting every segment of the trucking industry. Wages, training costs, and recruitment expenses are all rising.
- Insurance is sort of a hidden cost in trucking, but it is rising too. A serious side issue is that rising insurance costs tempt marginal firms to skimp on coverage or let it lapse.
- Fuel prices have come down a bit in recent months but are still uncomfortably high.
- Environmental restrictions and highway congestion are becoming facts of life, especially here on the West Coast.
- Against this background of rising costs customers continue to want better, faster, and cheaper service.

There are several regulatory and/or legislative issue son the horizon that could increase truck operating costs

- Hours of Service
- Electronic logs
- Repetitive motion injuries
- Reduction of highway access

Distribution Profiles Are Changing

The Economy is Changing

- Global access has increased accessibility of raw materials
- Global transportation has enabled us to lower labor costs

Industry is Changing

- Fewer Distribution Centers
- More frequent shipments
- Smaller average load size
- Faster replenishment cycle
- Lower inventories
- Improved information and technology
- Expanded logistics services

Truck Transportation Growth

Truck ton-miles are growing faster than other modes

Factors Which Influence Truck Growth

- Demographics influence Driver hire statistics
- Changes in distribution
- Advances in logistics technology
- Changes in inventory control methods
- Availability of competitive transportation services
- Cost of Capitol
- Price of fuel
- Cost of Insurance
- Hours of Service

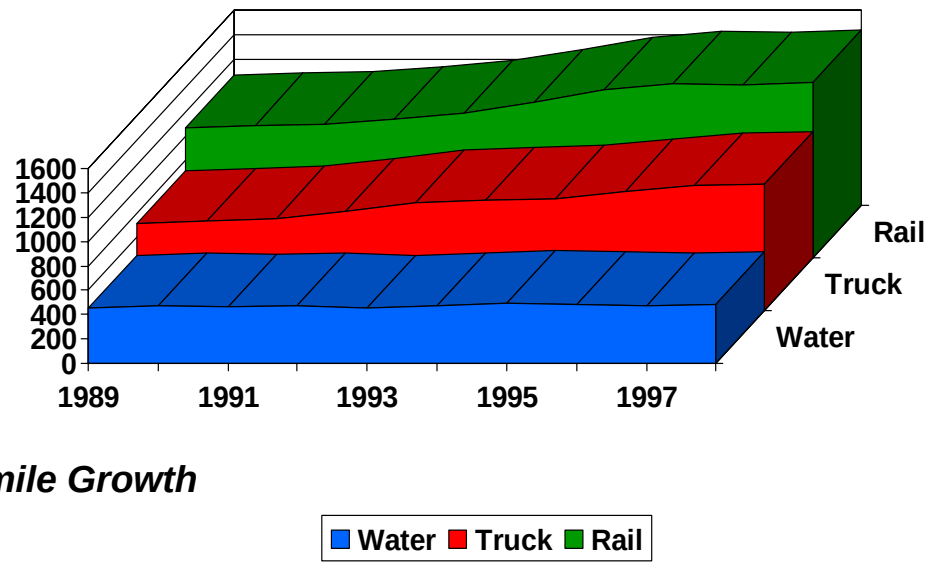


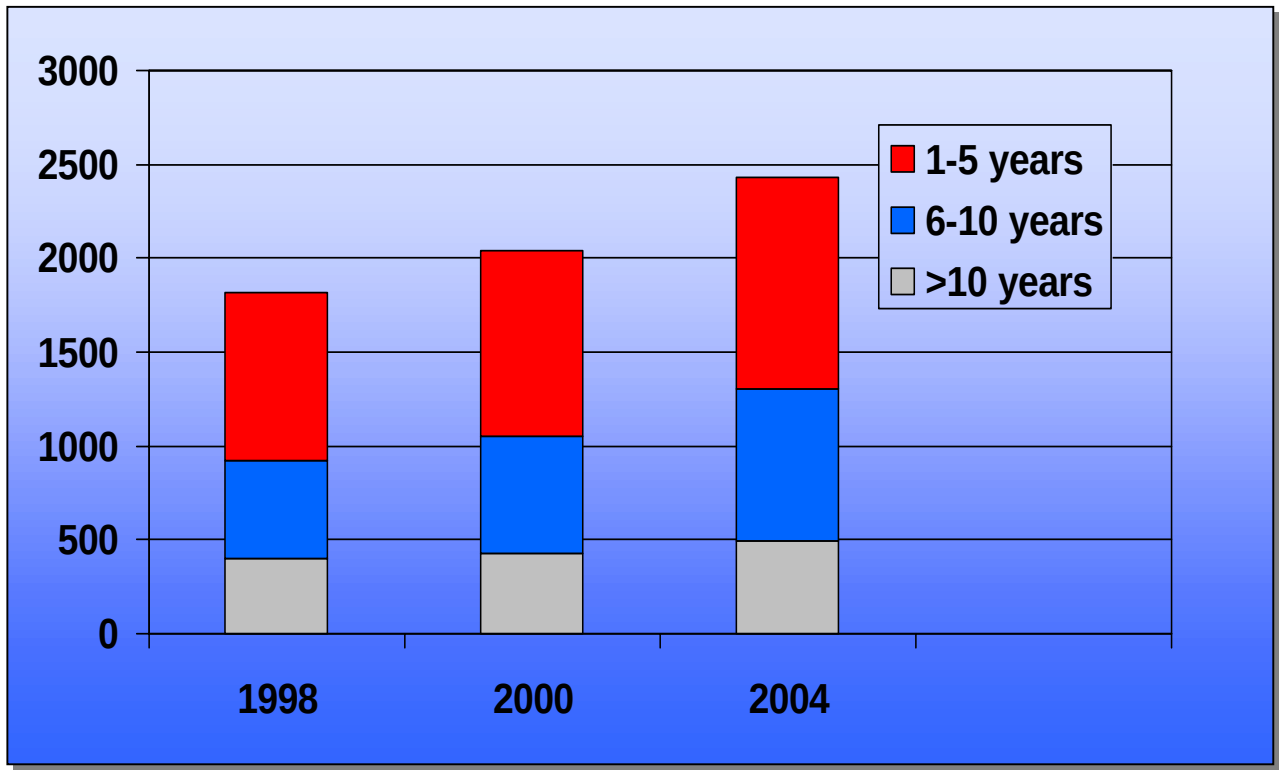
Exhibit 23: Modal Ton-mile Growth

Source Martin Labbe and Assoc.

Recent purchases are reducing the average age of the truck fleet

Exhibit 24: Truck Fleet Age

US Class 8 Vehicle Population Age Trends



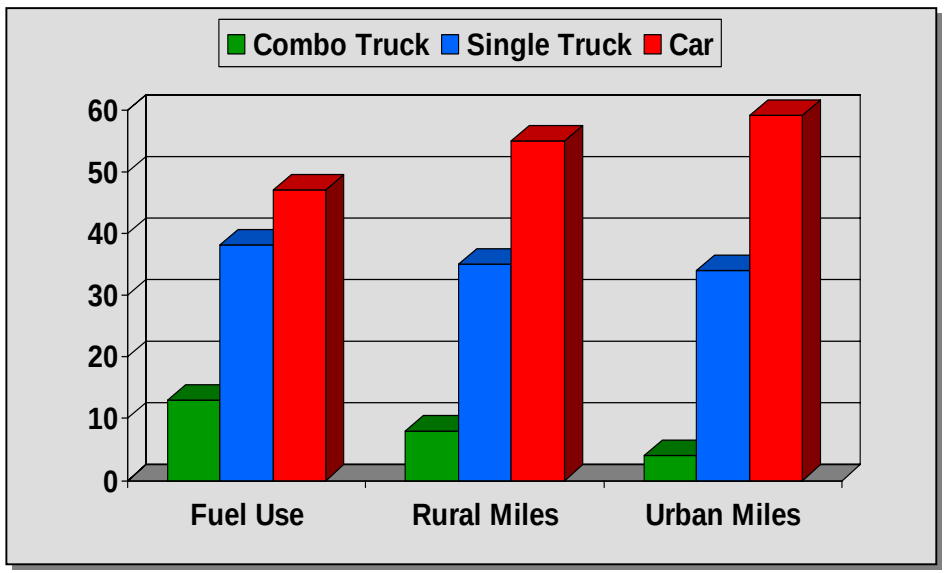
Trucks and the Environment

Combination trucks consumed less than 30% as much fuel as passenger vehicles did in 1998, only 14% of the total, but traveling only 8 percent as much mileage as passenger cars.

The industry is placing emphasis on fuel efficiency and design and maintenance initiatives. Between 1989 and 1998 combination truck miles rose 42% while the fuel consumption increased only 23%.

Exhibit 25: Trucking Fuel Consumption

1998 Vehicle Miles and Fuel Consumption

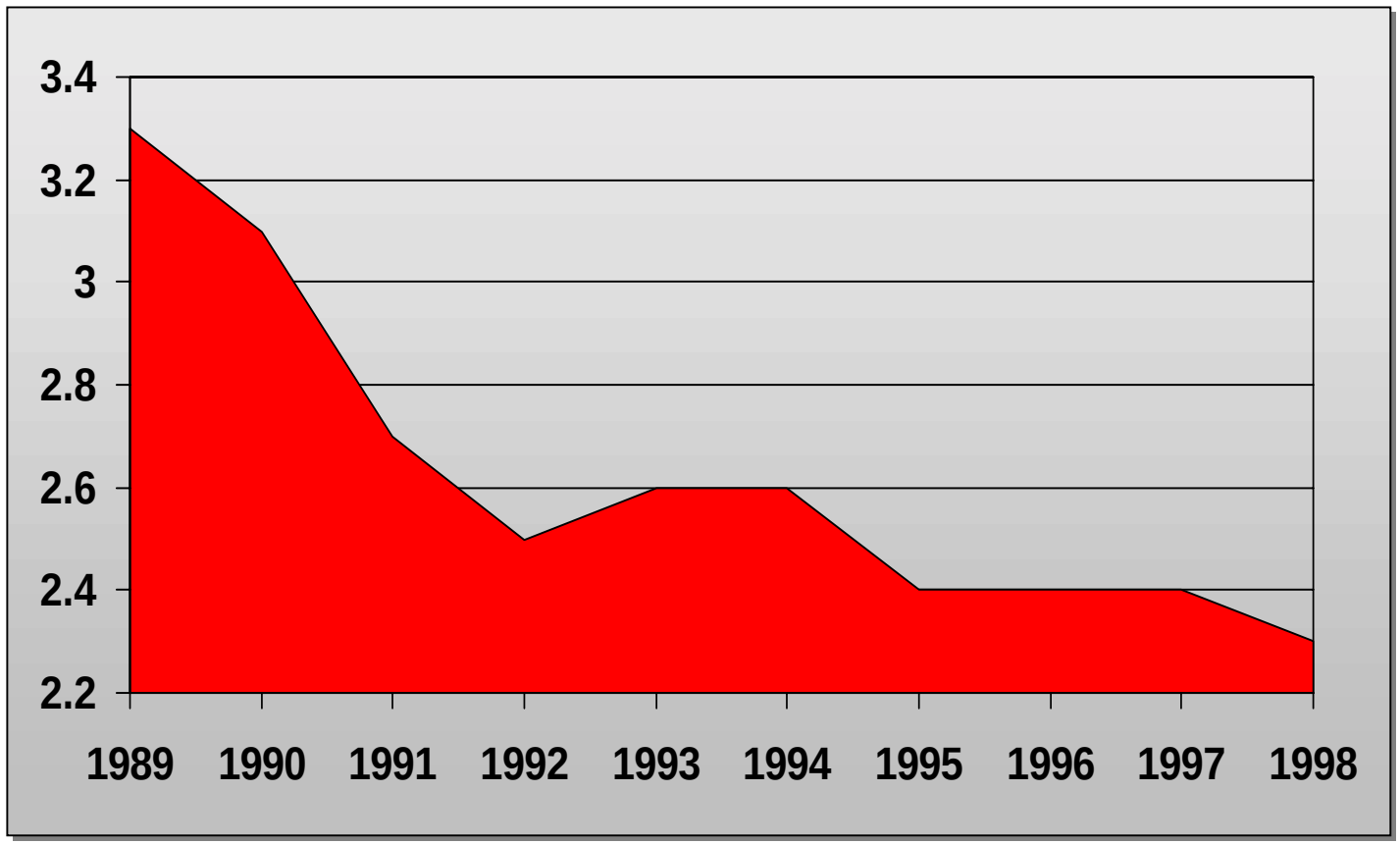


Source: Highway Statistics 1998. Federal Highway Admin, US DOT

Trucking Safety Is Improving

Exhibit 26: Trucking Safety

Safety – Fatal Crash Rates (per 100 million vehicle miles of travel)



Source: ATA Safety Department, National Highway Traffic Safety Admin, US DOT

Trucking Equipment and Technology Trends

Technology:

Will improve information in the supply chain.

While expensive to implement will be necessary to improve productivity.

More information will lead to improved services and pricing.

Equipment:

Tri axles will grow to meet heavy payload demand.

57’ trailers not like to grow in the “rust belt states” due to infrastructure limitations.

As driver population shrinks truckers will look toward equipment productivity gains.

Trucking Industry outlook

Expected Changes

- Freight growth will slow dramatically.
- Fuel prices will remain higher than historic averages.
- Driver availability will cause 25% increase in wages.
- Insurance increases will average 15% for the next three years.
- 60% of operating costs will face increases in excess of 15% per year.
- Hours of Service will be revisited.
- Environmental concerns and urban congestion will press for more freight options.

The Impact of E - Commerce

- Electronic posting of loads will increase productivity
- Length of haul will shrink
- Frequency of shipments will increase
- Weight of shipments will decrease
- Mode of shipment my shift from truckload to LTL
- Consolidation and Deconsolidation logistics industries will thrive during this transition.

Truck Forecast

- Trucks will continue to dominate most commodity groups. Truck will gain share in moving products relative to other modes. Most o the truck volume growth after 2003 will be attributed to increased output of manufactured goods and small package deliveries, e-commerce support.
  Improvements In the motor carrier market share through 2008 comes primarily at the expense of the rail industry.

Exhibit 27: Volume & Share by Mode 1998-2008

Mode	1998 Frt. Vol.	2003 Frt. Vol.	2008 Frt. Vol.	1998 Mode Share	2003 Mode Share	2008 Mode Share
Truck	7,688	8,296	9,274	63.3%	63.6%	64.3%
Rail	1,924	2,018	2,199	15.8%	15.5%	15.3%
Intermodal	148	170	207	1.2%	1.3%	1.4%
Air	18	23	28	.1%	.2%	.2%
Water	1,187	1,262	1,381	9.8%	9.7%	9.6%
Pipeline	1,188	1,264	1,322	9.8%	9.7%	9.2%
TOTAL	12,155	13,035	14,413	100%	100%	100%

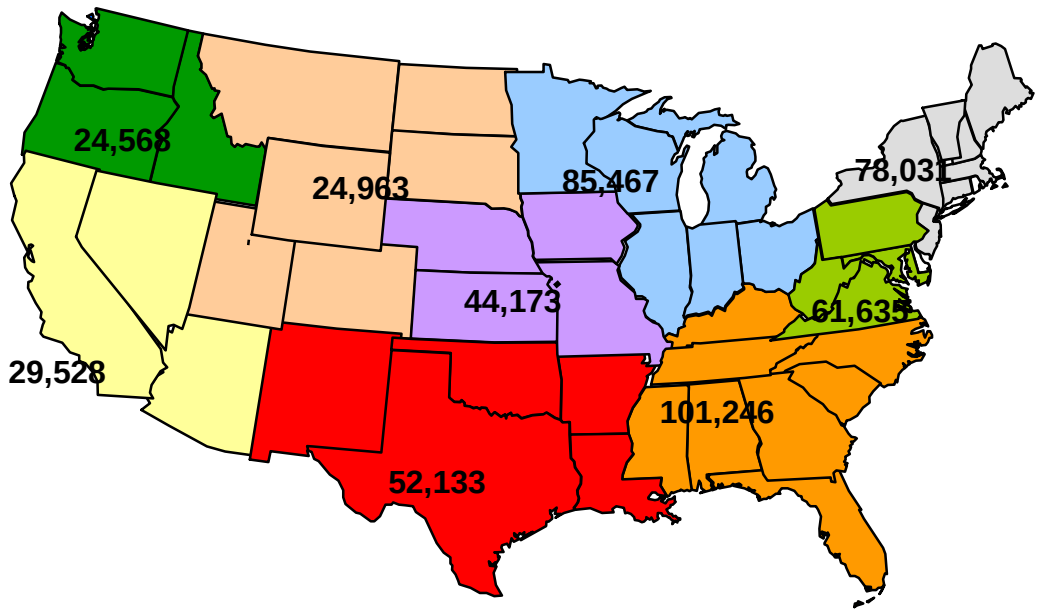
Distribution of Motor Carriers

According to the Office of Motor Carriers, in March 2000 there were more than 500,000 motor carriers in the U.S.

This incorporates all types of fleets, including for-hire, both TL and TLT, private carriers, owner operators and governments. Compared with December 1998 the total number of carriers rose by 9.3%

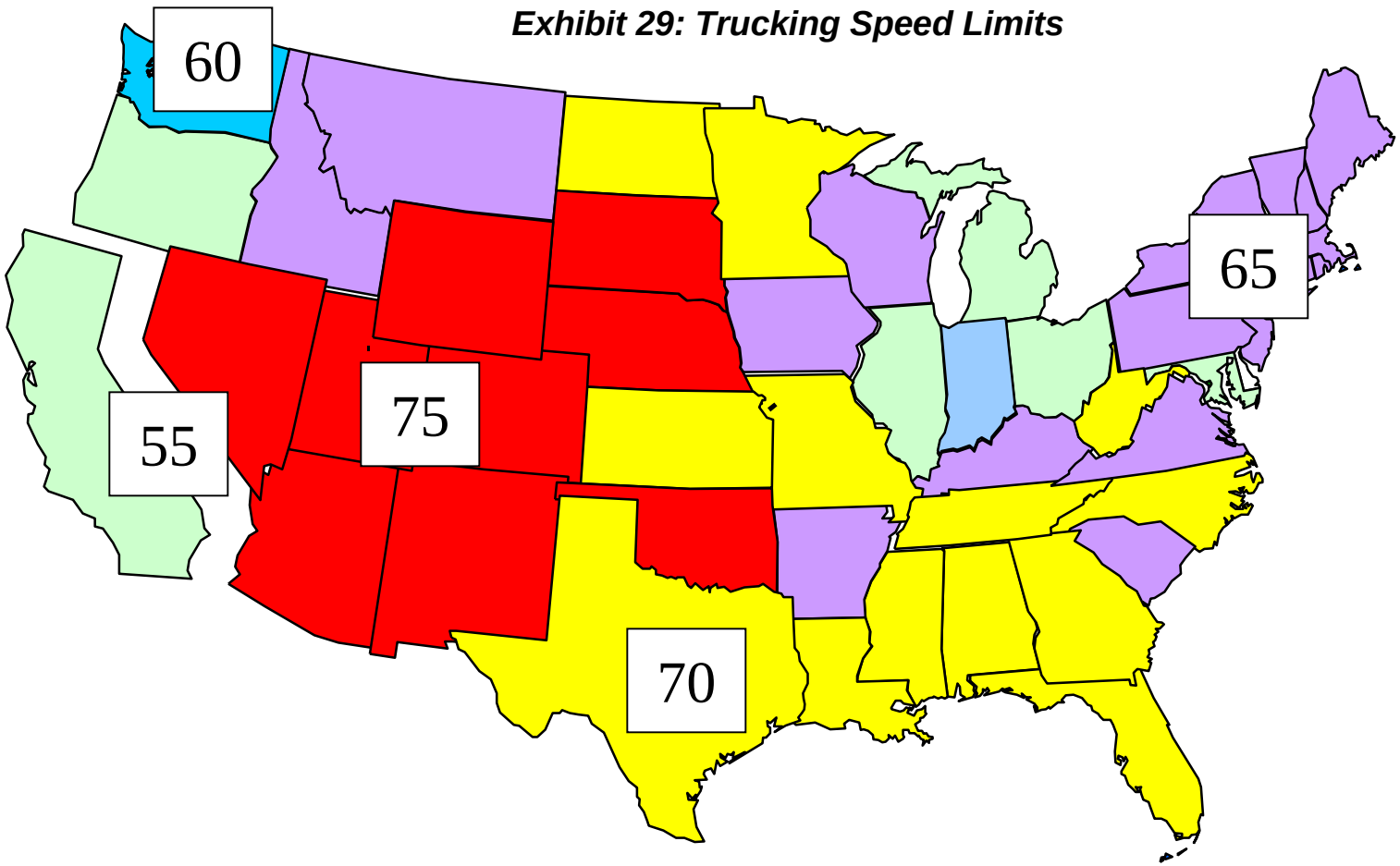
The SCAG Region is home to nearly 30,000 motor carriers of all kinds, and is also served by thousands of carriers located across the nation

Exhibit 28: National Distribution of Motor Carriers



California has a low speed limit for trucks

Exhibit 29: Trucking Speed Limits



California is a high-cost state for trucking

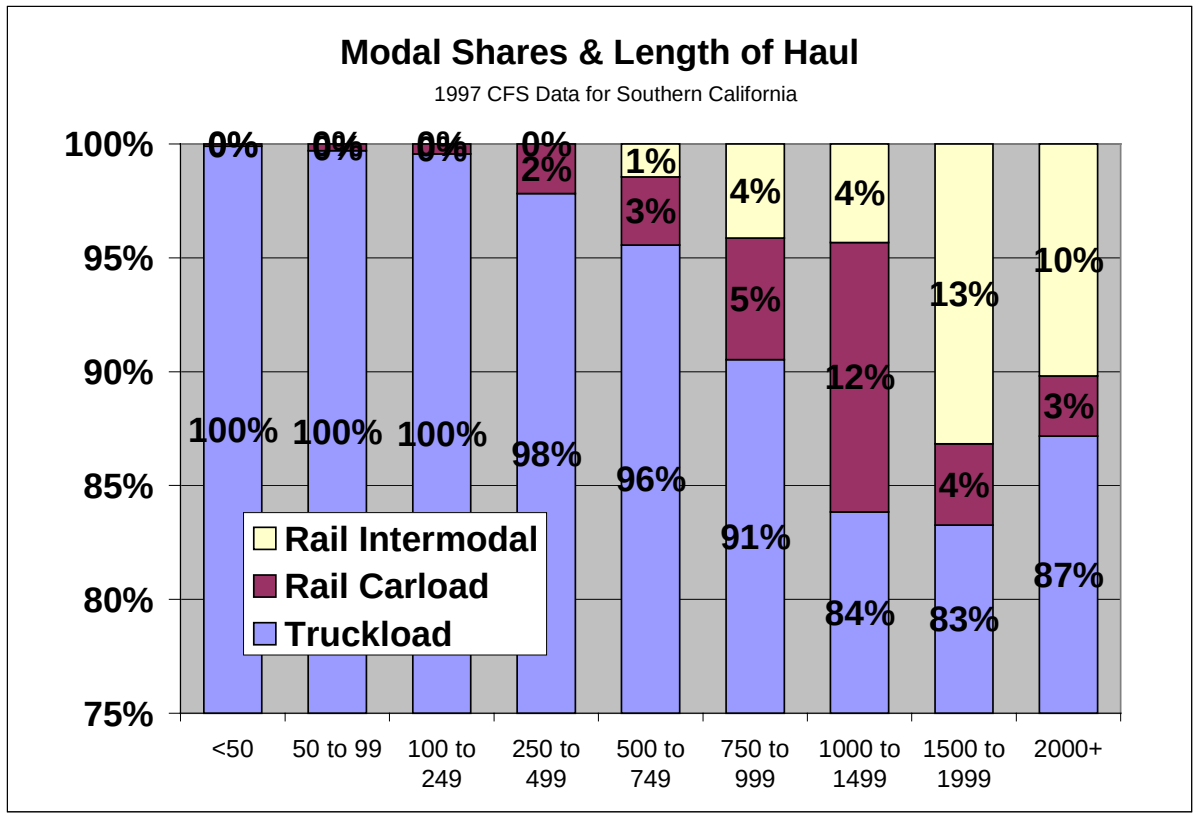
Exhibit 30: 1998 Commercial Truck State User Taxes

State	Annual Registration Fees	Fuel Tax on 14,035 gallons	Total Annual State Hwy fees	State Ranking
Oregon	$345	0	$11,265	1
New York	$995	$3,937	$8,892	2
Arizona	$3,631	$3,790	$7,420	3
California	$3,850	$3,509	$7,359	4
Colorado	$4,464	$2,877	$7,341	5

Truckload carriage dominates SCAG Regional shipment

Truckload carriers dominate SCAG regional shipments at all lengths of haul
Rail and intermodal competition becomes significant only beyond 500 miles

Exhibit 31: S. Calif. Modal Shares and Length of Haul



SCAG Region "Long-Haul" Truck Commodities

Exhibit 32: Long-Haul Truck Commodities